MORLEY IAS
FIRE SYSTEMS

# ZX1e
# ZX2e
# ZX5e

Document No. 996-131 Issue 01

# installation manual

**This manual should not be left with the end user.**

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# 1 Introduction

## *1.1 Notice*

- The material and instructions covered in this manual have been carefully checked for accuracy and are presumed to be correct. However, the manufacturer assumes no responsibility for inaccuracies and reserves the right to modify and revise this document without notice.
- These instructions cover the installation of the Fire Alarm Control Panels. Refer to the User Manual (P/N 996-130) for details of how to operate the system and refer to the Commissioning Manual (P/N 996-132) for information on programming and Level 3 functions.

For use with software version 800 onwards

- The ZX1E, ZX2E and ZX5E Fire Alarm Control Panels are 1, 1-2 and 1-5 loop panels for use with analogue addressable devices from the following detector manufacturer ranges: -

| | |
|---|---|
| Apollo | DISCOVERY XP95 S90 |
| Hochiki | HOCHIKI ESP COMPATIBLE |
| Morley-IAS | |
| Nittan | |
| System Sensor | |

**EN54-2**

**Nittan.**

- **The ZX1E, ZX2E & ZX5E Fire Alarm Control Panels are not EN54 approved for use with the Nittan range of signalling devices.**

  **If the Nittan loop driver card is installed, the LPCB logo MUST be removed.**

## *1.2 Warnings and Cautions*

**These instructions contain procedures to follow in order to avoid injury and damage to equipment. It is assumed that the user of this manual is a suitably trained installer who is familiar with the relevant regulations.**

**Electro-static Sensitive Devices.**

**Take suitable ESD precautions when removing or installing printed circuit boards.**

**This panel is CE Marked to show that it conforms to the requirements of the following European Community Directives:**

- **Electromagnetic Compatibility Directive 89/336/EEC (and the amending directive 92/23/EEC)**
- **Low Voltage Directive 73/23/EEC**

- **This panel has been tested and found to comply with the Year 2000 requirements.**
- **NOTE: The end date for all date functions is 31/12/2079.**
- **In the year prior to reaching the calendar end date, consult the Original Equipment Supplier/ Current Maintenance Contractor for advice.**

**CAUTION: A Lithium Battery is used for Data Retention.**

**Replace only with the same or equivalent type. Contact the Service Organisation for Replacement CPU Card.**

**EN54-2 13.7**

**Maximum of 512 sensors / manual call points per panel.**

- The ZX1E, ZX2E & ZX5E range of panels has many features, which if used inappropriately, may contravene the requirements of EN54. Where such a possibility may arise, a suitable warning is given with brief details of the EN54 requirement and the relevant section it pertains to. A typical EN54 non-compliance warning is illustrated.

## *1.3 National Approvals*

This equipment must be installed in accordance with these instructions and the appropriate national, regional and local fire systems installation regulations specific to the country and location of the installation. Consult with the appropriate Authority Having Jurisdiction (AHJ) for confirmation of the requirements.

**All equipment is to be installed in accordance with the appropriate standards for the country and area of installation.**

This equipment must be installed in accordance with these instructions and the appropriate national, regional and local wiring regulations. In the UK the wiring must conform to the requirements of the IEE Wiring Regulations – Sixteenth Edition.

## *1.4 EN54 Information*

- **This Fire Control Panel complies with the requirements of EN54-2/4 1997. In addition to the basic requirements of EN54, the panel conforms to the following optional functions.**

| Option | | EN54-2 Clause |
|---|---|---|
| **Indication:** | **Fault signals from points** | 8.3 |
| **Controls:** | **Coincidence Detection** | 7.12 |
| | **Delays of Actioning Outputs** | 7.11 |
| | **Disablement of each address point.** | 9.5 |
| | **Test condition** | 10 |
| **Outputs:** | **Outputs to fire alarm devices** | 7.8 |

- **The power supplies for the ZX1E, ZX2E and ZX5E range of panels complies with the following clauses of EN54-4.**

| ZX2E & ZX5E Power Supply Functions | EN54-4 Clause |
|---|---|
| **Derive power supply from main power source** | 5.1 |
| **Derive power supply from a standby battery source** | 5.2 |
| **Charge and monitor the standby battery source** | 5.3 |
| **Detect & signal power supply faults** | 5.4 |

- **In addition to the functions required by EN54-2, the panel supports a number of ancillary functions that are not required by EN54. These are outlined below:-**

| Ancillary Function | Manual Section |
|---|---|
| **Auxiliary supply output** | 3.4.6 |
| **Panel network output ports (Port C)** | 3.4.7, 3.5.1.1 & 3.5.1.3 |
| **Master panel to superior master panel output port connections (Port B - ZX5E only)** | 3.4.7.2, 3.5.1.1 & 3.5.1.3 |
| **Panel to graphics PC output port connections (Port B – ZX5E only)** | 3.4.7.3, 3.5.1.1 & 3.5.1.3 |
| **Peripheral loop output & supported devices (Port D)** | 3.4.8, 3.5.1.1 & 3.5.1.3 |
| **High integrity 485 Loop** | 3.4.10 & Hi485 Installation Guide (996-065) |
| **Auxiliary relay outputs** | 3.4.5 |
| **Printer option (ZX5E only)** | 3.5.4 |
| **Class Change Input** | 3.4.12 |
| **Group Disable** | 3.4.11 |

# 2 Unpacking

- The ZX1E, ZX2E and ZX5E Fire Alarm Control Panels are simple to install if the recommended procedures described in this manual are followed. Refer to the Commissioning Manual for details of how to program the system operation.
- Before installing the ZX1E, ZX2E or ZX5E Fire Alarm Control Panels, first ensure that all the equipment has been received. The packing box should contain the following items.

| Item | Component | Part Number | Quantity | | |
|---|---|---|---|---|---|
| | | | ZX1e | ZX2e | ZX5e |
| 1 | ZX5E Fire Alarm Control Panel or | | - | - | 1 |
| | ZX2E Fire Alarm Control Panel or | | - | 1 | - |
| | ZX1E Fire Alarm Control Panel | | 1 | - | - |
| 2 | Installation Manual | 996-131 | 1 | 1 | 1 |
| 3 | Commissioning Manual | 996-132 | 1 | 1 | 1 |
| 4 | Operator' Manual | 996-130 | 1 | 1 | 1 |
| 5 | Reference Guide – ZX5E | 996-135 | - | - | 1 |
| | Reference Guide - ZX2E | 996-134 | - | 1 | - |
| | Reference Guide – ZX1E | 996-133 | 1 | - | - |
| 6 | Front Door Keys | 797-021 | 2 | 2 | 2 |
| 7 | Ferrite Absorber Small | 538-143 | 1 | 1 | 1 |
| 8 | Ferrite Absorber Large | 684-353 | 1 | 1 | - |
| 9 | Battery Cables Kit | 082-073 | 1 | 1 | 1 |
| 10 | EOL Resistor | 627-682 | 2 | 2 | 4 |

**Table 1 – Packing Contents List**

- Frame and mount the supplied Reference Guide, on the wall, adjacent to the Panel.

NOTE:

The EOL resistors supplied are standard resistors. If EOL resistor assemblies with 150 mm flying leads are required, please order these separately under part number 170-073-682.

# 3 Installation

## *3.1 Installing the Enclosure*

- Unlock the front door and remove the battery cable, ferrite absorber and EOL resistor kits. Store these in a secure place for re-use later.

### 3.1.1 Removing the Chassis

- Unplug the ribbon cable between the CPU Board and the Display Board at the CPU Board end.
- Remove the nuts and spring washers holding the chassis to the back box. (There are six of each for ZX5E, and four of each for ZX1E / ZX2E). Store these in a secure place for re-use later.
- Carefully remove the chassis assembly. Store in a secure place where it will not be damaged and where it will be kept dry and clean.

**Handle the chassis by holding the metalwork only. DO NOT lift it by holding the printed circuit boards or any parts on the circuit boards.**

### 3.1.2 Mounting the Enclosure to the Wall

**The ZX5E Fire Alarm Control Panel can weigh in excess of 38kg (ZX5E) and 18kg (ZX2E) once the batteries are fitted. When attaching the enclosure to a surface, use mounting hardware capable of supporting this weight and reinforce the wall if necessary.**

- Remove the necessary knockouts for the installation cabling.
- Mount the enclosure in the desired location using all four mounting holes.
- Use a drill bit diameter 7.0 mm and a suitable 40 mm long expansion plug. Fix the panel to the wall with No. 10 screws length 1½" or M5 screws length 40 mm.
- Install the external wiring into the enclosure using the appropriate glands / conduit fittings. Sufficient knockouts are provided at the top of the enclosure. If you punch other holes, be sure that they do not interfere with any component mounting positions.
- Use a brush to clean any dust and swarf from inside the enclosure before attempting to remount the chassis assembly.

**For details of knockout positions, refer to section 3.4.15. Cables must be megger tested before any active devices are fitted and before the connections are made to the terminal blocks.**

### 3.1.3 Remounting the Chassis

- Carefully mount the chassis onto the mounting threaded studs.
- Secure the chassis to the back box using the nuts and spring washers that were originally removed.
- Plug the ribbon cable between the CPU Board and the Display board back into the CPU Board. The plug and socket are polarised to ensure correct insertion.

**Handle the chassis by holding the metalwork only. DO NOT lift it by holding the printed circuit boards or any parts on the circuit boards.**

## *3.2 Dimensions and Fixing Points*

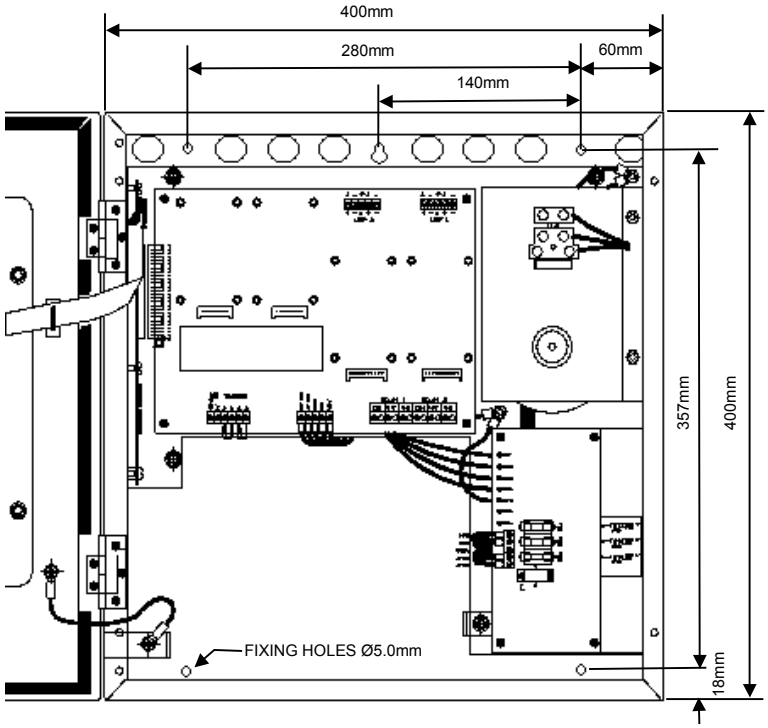



**Figure 1 – Panel Fixing Centres – ZX1E / ZX2E**

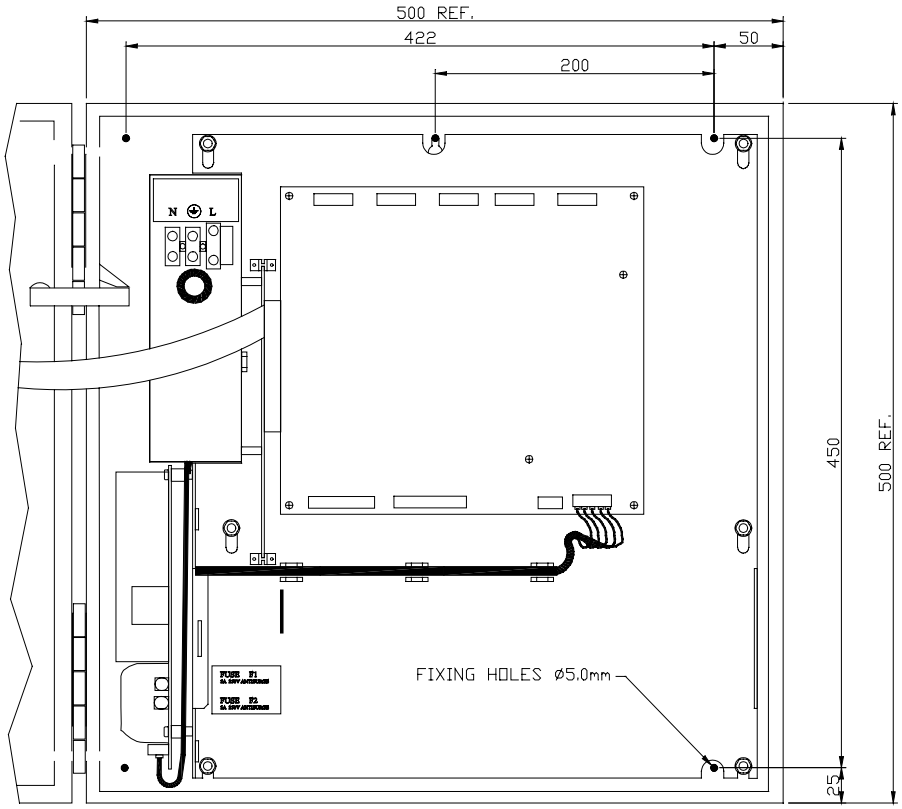



**Figure 2 – Panel Fixing Centres - ZX5E**

## *3.3 Identification of Parts*

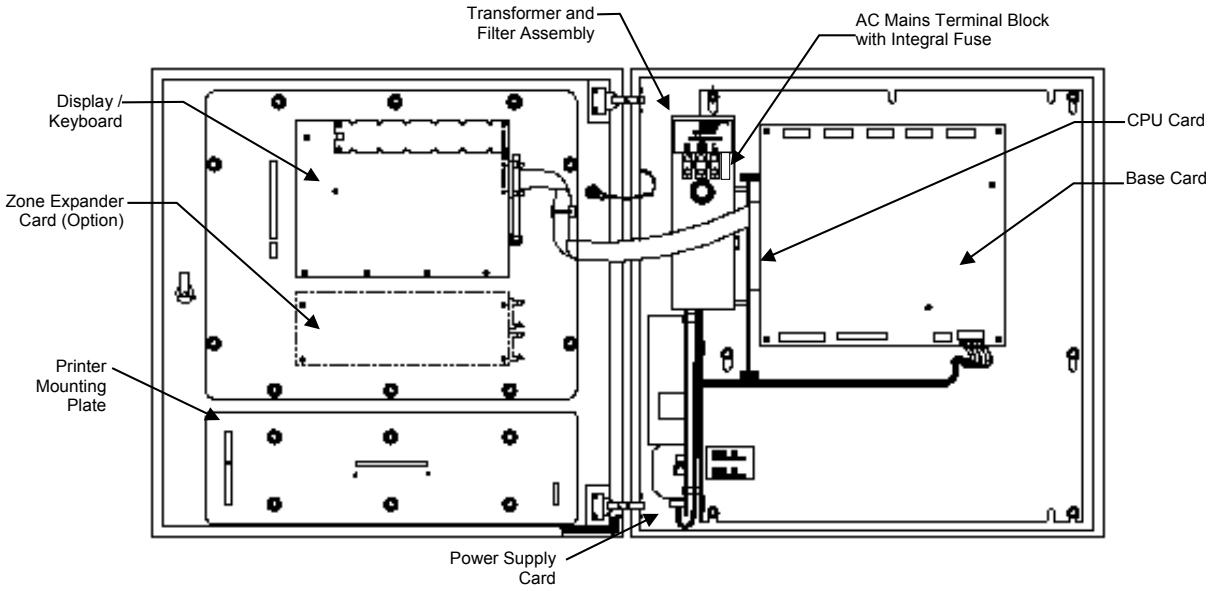



**Figure 3 – Enclosure Arrangement - ZX5E**

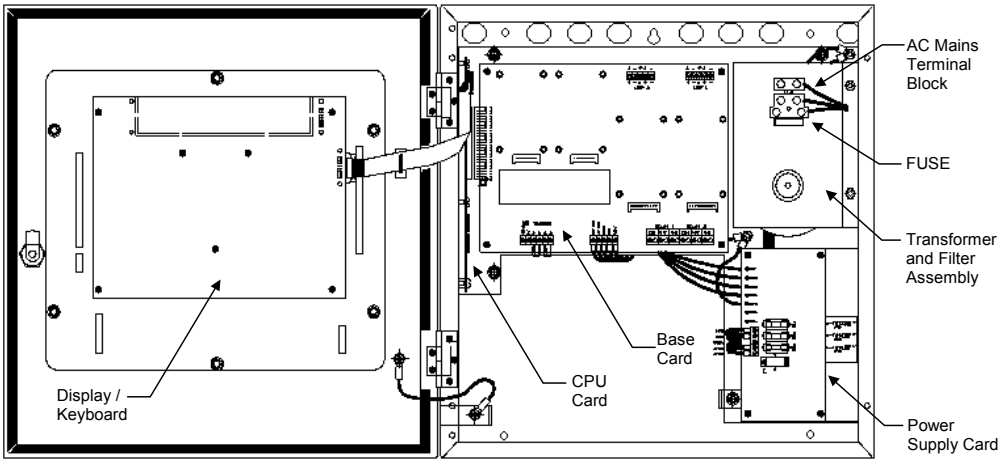



**Figure 4 – Enclosure Arrangement – ZX1E / ZX2E**

### 3.3.1 CPU Board

- The CPU Board controls the operation of the ZX1E, ZX2E and ZX5E Fire Alarm Control Panels. The operating program is stored in EPROM mounted in sockets on the board.

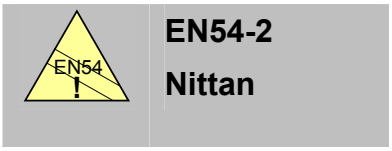
### 3.3.2 Display / Keyboard

- The Display / Keyboard provides the user access to view alarms and control operation of the system.

### 3.3.3 Base Card

- The base card provides control and wiring of all external connections to the system.
- The base card will be augmented with one (ZX1E), one to two (ZX2E) or one to five (ZX5E) plug-in loop driver modules for connection to the signalling detectors.
- The system can support addressable smoke detectors and loop devices using different loop driver boards. The options are as follows:

| | | |
|---|---|---|
| 1. | Morley-IAS | 795-072 |
| 2. | System Sensor | 795-068 |
| 3. | Hochiki | 795-058-005 |
| 4. | Apollo XP95 / Discovery | 795-066 |
| 5. | Nittan | 795-044 |


EN54
!
EN54-2
Nittan
The panel is not EN54 approved for use with Nittan.
If the Nittan option is fitted, the LPCB logo insert label MUST be removed.

- For details of the compatible signalling devices, refer to the relevant installation guide supplied with the loop driver module. At least one loop driver board MUST be installed for the unit to operate as a Fire Alarm Control Panel.
- The base card may be augmented by one (ZX1E), one or two (ZX2E) or by one, two or three (ZX5E) plug-in serial interface cards. The serial interface cards provide for networking of panels and for connection of peripheral devices. The ZX1E cannot be installed as part of a network.

### 3.3.4 Zone Extender Card *(ZX5E Option Only)*

- The ZX5E FACP may be augmented with an additional Zone LED Indicator card. This Zone Expander Card provides FIRE ALARM and FAULT LED indicators.
- It is available in two options providing, a further 20 zones (40 zones in total) or a further 60 zones (80 zones in total). The model numbers of the units are as follows:
  1. 795-077-020 20 Zone LED Expander
  2. 795-077-060 60 Zone LED Expander
- Refer to the Zone Expander Installation Guide (P/N 996-137) for further information.

### 3.3.5 Internal Printer (ZX5E Option Only)

- The ZX5E FACP may be augmented by the addition of a printer module. This provides printed records of FIRE ALARMS, FAULTS and EVENT LOG.
- Refer to Section 3.5.4 and to the Commissioning Manual for further information.

## *3.4 External Connections*

BEFORE INSTALLATION: Refer to Ratings / Type label located on the inside of the panel.

### 3.4.1 Mains Power Input

#### *3.4.1.1 ZX1E / ZX2E Arrangement*

- The ZX1E and ZX2E Fire Alarm Control Panels receive power from either a 230V, 50Hz (or 120V, 60Hz-power supply[1]). The current flows through an EMI filter to the transformer. The transformer converts the input mains voltage to 24V AC. All of these components are mounted to the chassis.
- The incoming power feed cable Ground or Earth (Green or Green/Yellow) wire should be connected to the terminal block earth connection – middle terminal.
- Connect the neutral (Blue/Black) wire to the top terminal and connect the Phase or Live (Brown/Red) wire to the bottom terminal. The terminal block contains an integral fuse.

**Open and lock out the circuit breaker before connecting any wiring. Do not power the system until the installation is complete.**

**Maintain separation between the 120/230V and the low voltage wiring. Do not route in the same trunking and keep apart in the enclosure.**

**For EMC Compliance, fit the supplied Ferrite Absorber (large) as shown in the diagram.**

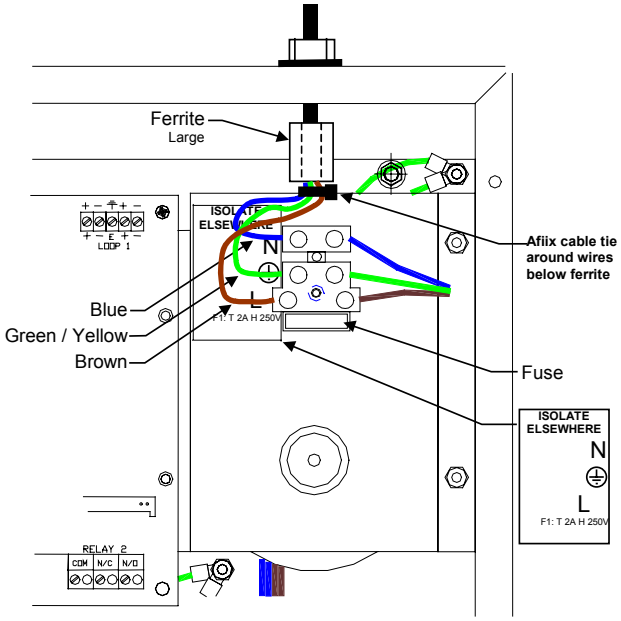



**Figure 5 – Mains Input Arrangement – ZX1E / ZX2E**

**The panel shall be supplied with AC mains power via a readily accessible disconnect device ('isolation' switch) to facilitate servicing and be provided with suitable earth fault protection incorporated in the building installation wiring. The minimum cross sectional area of the mains cable should be 0.75mm and the supply should be fused with a 5A HRC anti-surge fuse.**

#### *3.4.1.2 ZX5E Arrangement*

- The ZX5E Fire Alarm Control Panel receives power from a 230V, 50Hz (or a 120V, 60Hz power supply[1]). The current flows through an EMI filter and a chassis mounted fuse, to the transformer. The transformer converts the input mains voltage to 24V AC. All of these components are mounted to the chassis.
- The incoming power feed cable Ground or Earth (Green or Green/Yellow) wire should be connected to the terminal block earth connection – middle terminal.
- Connect the neutral (Blue/Black) wire to the left-hand terminal and connect the Phase or Live (Brown/Red) wire to the right hand terminal.

[1] With the appropriate transformer fitted.

**Open and lock out the circuit breaker before connecting any wiring. Do not power the system until the installation is complete.**

**Maintain separation between the 120/230V and the low voltage wiring. Do not route in same trunking and keep apart in the enclosure.**

**Replace the cover, supplied, over the terminal block.**

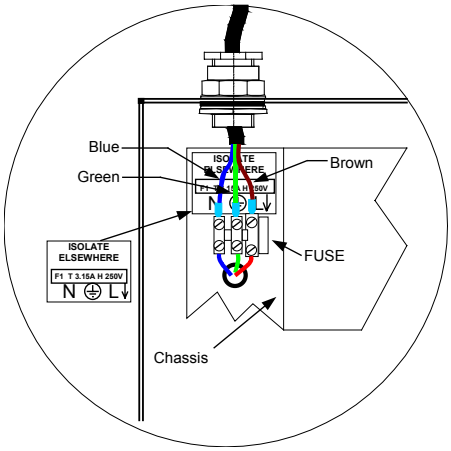



**Figure 6 – Mains Input Arrangement – ZX5E**

**The panel shall be supplied with AC mains power via a readily accessible disconnect device ('isolation' switch) to facilitate servicing and be provided with suitable earth fault protection incorporated in the building installation wiring. The minimum cross sectional area of the mains cable should be 0.75mm and the supply should be fused with a 5A HRC anti-surge fuse.**

### *3.4.1.3 Mains Cable Glands*

**The cable gland and cord anchorage bushing used to route the mains cable through the 20mm knockout MUST have a minimum flame retardant rating of 94HB.**

- **Typical glands / bushings are: -**

| Type | Manufacturer | Supplier / Part No. |
|---|---|---|
| Gland IP68 – Nylon 66 M20 Black, Rating UL94V-2 | Multicomp | Farnell 927-739 |
| Gland IP65 – Brass M20, EExd / Eexe | Lappcable | A2F20S |
| Bushing Nylon 66 M20 Black, Rating UL94V-2 | Multicomp | Farnell 303-0751 |

## 3.4.2 Battery Installation

### *3.4.2.1 General Introduction*

- Refer to the Standby Battery Calculations (section 4) for the size of the batteries required for a particular installation.
- Refer to Section 5.2.3 for a list of recommended batteries.

**Do not make the final battery connections until the installation is complete.**

**Battery Lead Connections are not power limited.**

**Before installation.**

**New Batteries require 'top charging' prior to being put into service. For further information and for a list of recommended batteries, refer to Section 5.2.3.**

### *3.4.2.2 ZX1E / ZX2E Arrangement*

- Included in the packing is a battery cable kit. Use the cable included in this kit to connect the negative terminal of battery No.1 to the positive terminal of battery No.2.
- Connect the red wire from terminal (7) on the Power Supply to the positive terminal of battery No.1.
- Connect the black wire from terminal (6) on the Power Supply to the negative terminal of battery No.2.
- The standby batteries should be located in the enclosure as shown in the diagrams opposite.
- For battery sizes greater than 12Ah, these should be installed in a separate enclosure suitable for Fire Protection Use, such as Battery Box 797-025-001, with wiring connected to the panel through conduit.

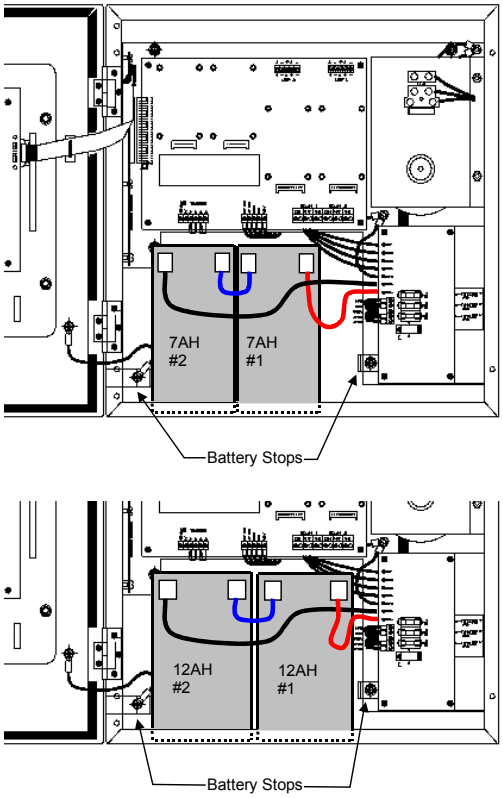



**Figure 7 – ZX1E / ZX2E Battery Installation**

### 3.4.2.3 ZX5E Arrangement

- Included in the packing is a battery cable kit. Use the cable included in this kit to connect the negative terminal of battery No.1 to the positive terminal of battery No.2.
- Connect the red wire from terminal (6) on the Power Supply to the positive terminal of battery No.1.
- Connect the black wire from terminal (7) on the Power Supply to the negative terminal of battery No.2.
- The standby batteries should be located in the enclosure as shown in the diagrams opposite. The chassis provides fixing points to allow a strap to be fitted.
- For battery sizes greater then 12Ah, it is necessary to cut off the spade terminals connected to the battery cables. These should be replaced by connector fixings appropriate to the installed batteries
- For battery sizes greater than 25Ah, these should be installed in a separate enclosure suitable for Fire Protection Use, such as Battery Box 797-025-001, with wiring connected to the panel through conduit.

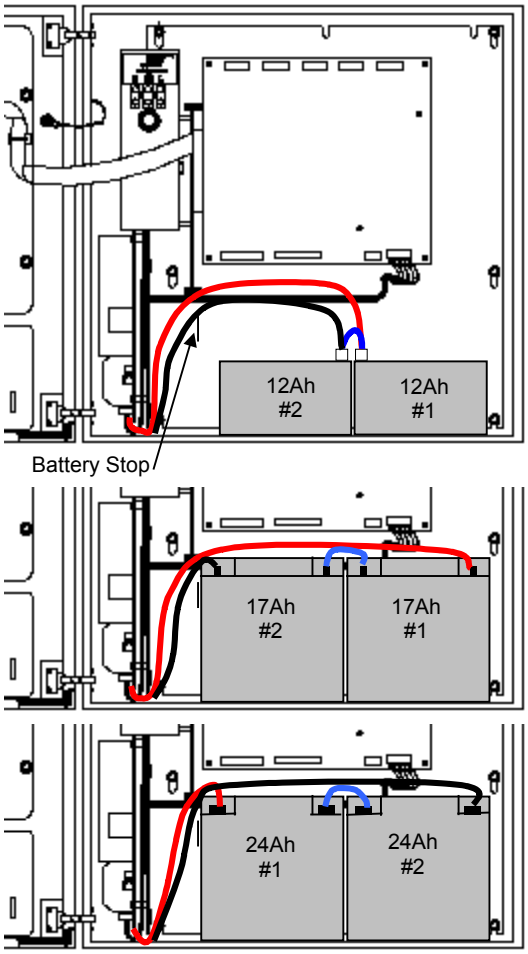
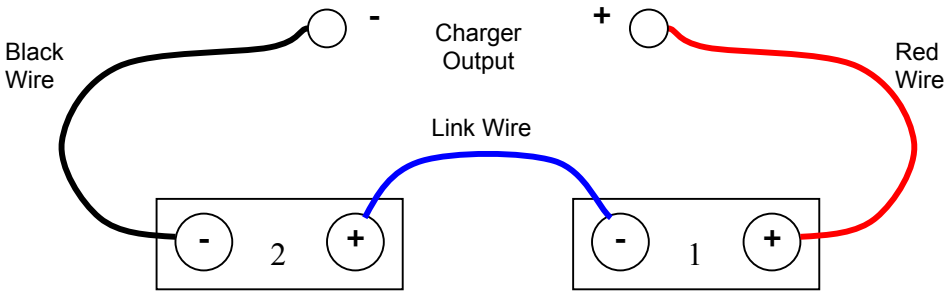



**Figure 8 – ZX5E Battery Installation**

### 3.4.2.4 General Battery Connection



### 3.4.3 Detection Loops

- The control panel supports analogue detectors with a digital, data transmission system. It provides power and communicates with the initiating devices over a two-wire circuit.

**EN54-2 13.7**

**Maximum of 512 sensors / MCP's per panel.**

- Depending on protocol, it is possible for up to 1000 addressable input points to be connected to the panel.
- To comply with EN54-2 requirements, a maximum of 512 sensors / MCP's (input points) only should be connected to the control panel across all analogue detection loops. This limit includes any conventional detectors / call points connected to the system via zone monitors.

**The detection circuit should be separated from other cable runs to minimize the risk of external interference. Under extremely noisy conditions, twisted pair wire is recommended to reduce interference.**

**The Detection Loop Circuits are supervised and power limited.**

- Shielded cable should be used for all detection (SLC) circuits. It is important that the shield is always terminated to a good earth connection at both ends of the loop. Mineral insulated copper cable (MICC) is recommended for the best screening purposes. However, most of the established brands of fire related screened cables are suitable. Refer to Section 3.4.13 for a list of recommended cables.
- The core size, length of wiring run and detection circuit loading will produce a voltage drop along the length of the cable. To determine if the installed loop driver can fully support the planned loop configuration, use the detector manufacturers' calculations for voltage and capacitance.

**ALWAYS check that conductors of appropriate diameter are used so that the voltage at the detectors is within the detector manufacturer's specification.**

**The maximum permitted impedance for the SLC Loop is 40 ohms. This must be reduced if loop powered sounders are installed.**

- The following table lists the maximum recommended cable loop lengths for each detection loop type. Wiring to external devices should follow the appropriate manufacturer's instructions.

| Loop Driver | Maximum Loop Length | | | |
|---|---|---|---|---|
| | MICC 1.5mm | 18 AWG | 16 AWG | 14 AWG |
| Morley-IAS | 2 km | 1 km | 1.5 km | 2 km |
| System Sensor | 2 km | 1 km | 1.5 km | 2 km |
| Apollo | 2 km | 1 km | 1.5 km | 2 km |
| Hochiki | 2 km | 1 km | 1.5 km | 2 km |
| Nittan | 1 km | 0.8km | 1 km | 1 km |

**Table 2 – Maximum Loop Lengths**

- NOTE 1: Cable runs in excess of 2km are not recommended. Otherwise, cable capacitance (Max. 0.5uF per loop) and inductance may start to interfere with data transmission. Refer to the manufacturers' quoted figures for maximum cable capacitance.
- The SLC (detector) circuits should be installed as loops with or without isolator modules. The wiring details are as described below.

**EN54-2 12.5.2**

**Maximum of 32 sensors / MCP's between Isolator.**

**For best results and system integrity:**

**The detection loop circuit should be wired as a loop with short circuit isolators. This will allow the system to still function, even if a section of the cable becomes open circuited. It is recommended that Short circuit isolators be fitted to the detection loop to prevent an external short circuit from removing more than 32 addressable points from the system.**

- The detection loop connections are made on the terminal blocks at the top of the base card.

### *3.4.3.1 Loop Wiring Installation*

- Form the loop by taking wires from the positive and negative terminals, at one side of the connector on the base card – see opposite.
- Proceed with installing wiring, around the loop, connecting all devices – see below.
- Return the wiring to the positive and negative terminals at the other side of the connector on the base card.
- Ensure that all devices connected to the loop are correctly oriented for positive and negative connections.
- Refer to the detector manufacturers' data sheet supplied with the signalling device.

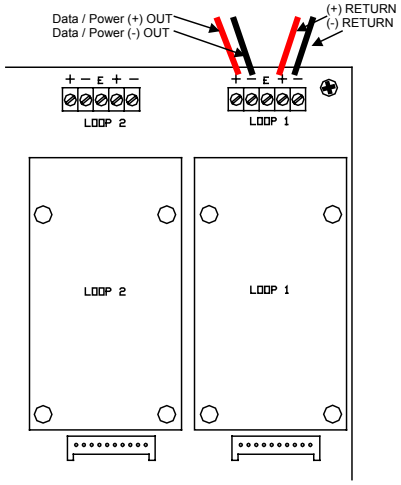



**Figure 9 – SLC Connections**

**FACP Connections**

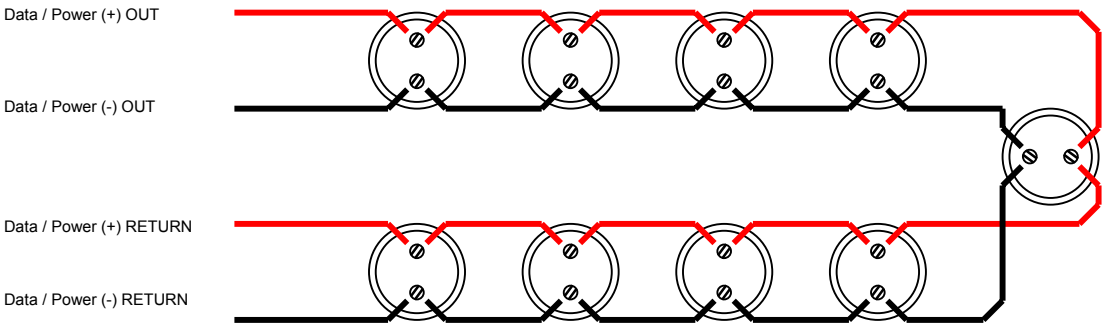



**Figure 10 – Loop Wiring without Isolators**

**DO NOT loop wiring under any terminals. Break wire run to maintain supervision.**

- It is recommended that Short Circuit Isolators be installed. Install the isolators at strategic points in the loop (i.e. zonal boundaries) to prevent an external short circuit from removing more than 32 addressable points from the system. Note: The loop driver modules have built-in isolators so it is not required to place isolator modules on the outputs of the FACP.
- Refer to the following diagram for information.

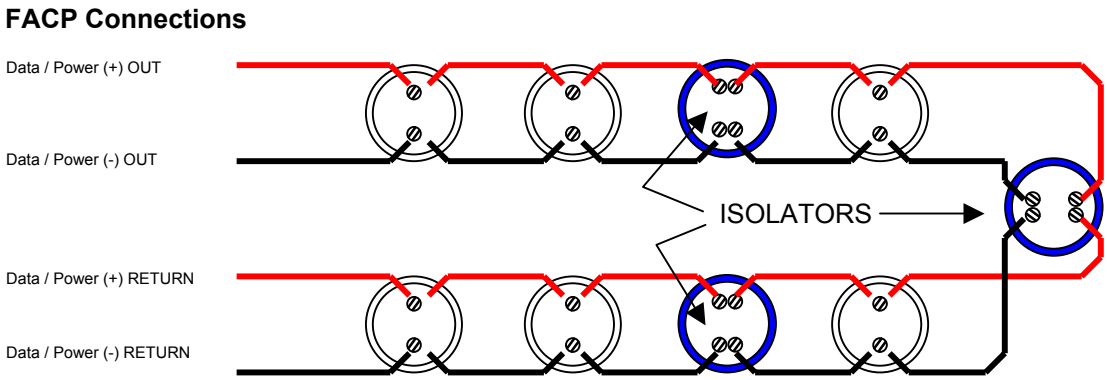



**Figure 11 – Loop Wiring with Isolators– Prefered Alternative**

### *3.4.3.2 EMC Compliance*

**For EMC Compliance, fit the Ferrite Absorbers supplied with the loop driver board around the SLC Loop cables.**

**The figure opposite shows the typical arrangement for a typical installation.**

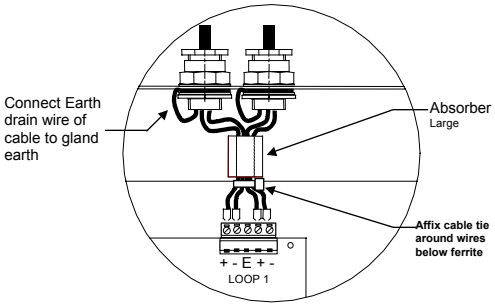



**Figure 12 – SLC Loop – EMC Absorber Installation**

### *3.4.3.3 Panel Loop Loading*

- Care must be taken to ensure that the number of signalling loop devices (inputs and outputs) installed does not exceed the power supply ratings of each individual loop driver board and of the panel (all loops) in both quiescent and alarm conditions.
    1. Loop Driver Board Load (Refer to the documentation supplied with the loop driver)
    2. Overall Panel Load (Refer to Specification Tables – Section 6).

## 3.4.4 Sounder Circuits

- The ZX1E and ZX2E Fire Alarm Control Panels have two power limited and supervised sounder circuits, identified as sounder circuits A and B.
- The ZX5E Fire Alarm Control Panel has four power limited and supervised sounder circuits, identified as sounder circuits A, B, C and D.
- Each circuit has a maximum rating of 1 Amp.
- Each sounder output is monitored for open and short circuits. An end-of-line (EOL) resistor (6.8KΩ, 0.5W minimum, P/N 170-073-682) must be fitted to the last sounder on the circuit.
- Each sounder should have an integral blocking diode that prevents the sounder from consuming any power in the normal monitoring position. The polarity of the sounder output is reversed when the sounder circuit is energised. This allows the sounder to turn on.

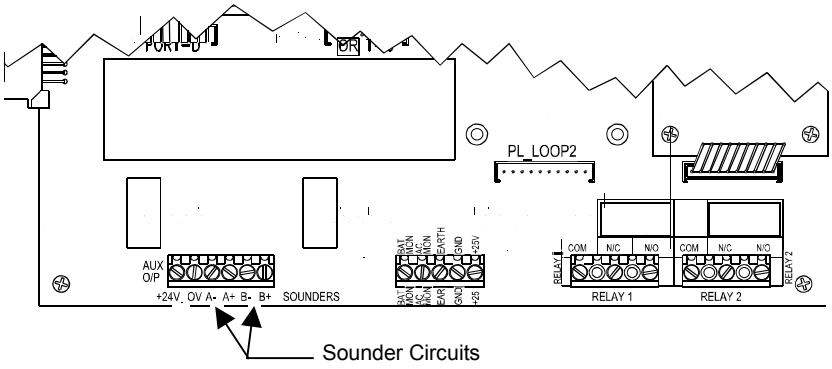



**Figure 13 – Sounder Terminal Connection Points – ZX2E**

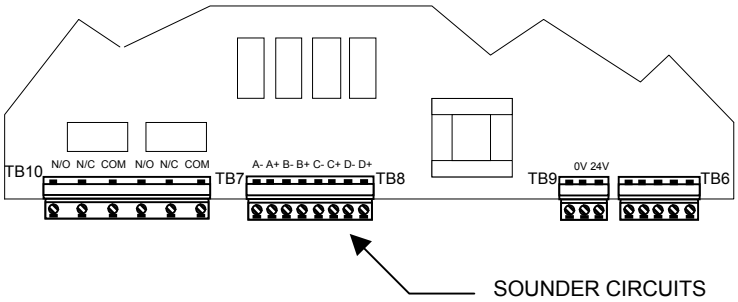



**Figure 14 – Sounder Terminal Connection Points – ZX5E**

- Any other devices connected to sounder outputs must be suppressed and polarized.
- Refer to Section 3.4.13 for a list of recommended cables.

**FACP Connections**

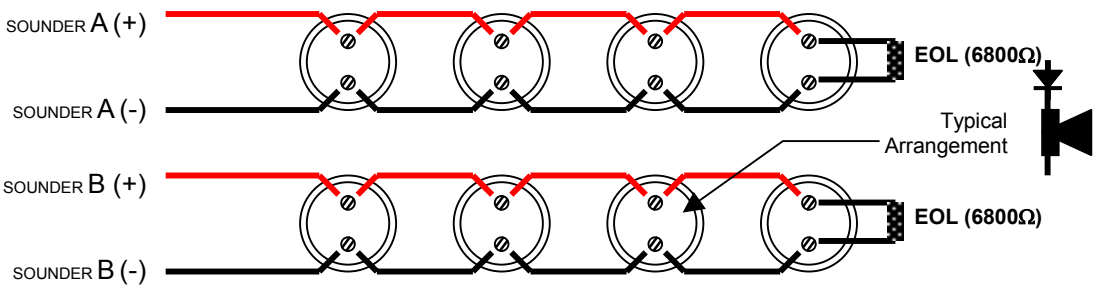



**Figure 15 – Sounder Wiring**

**DO NOT loop wiring under any terminals. Break wire run to maintain supervision.**

- Cable runs in excess of 1km (3200') are not recommended. Otherwise, the capacitance and inductance of the cable may affect the performance of the system. For systems with Nittan detectors, cable runs should not exceed ½ km (1600').
- Always check that conductors of appropriate diameter are used so that the voltage of all sounders is within the manufacturers specification when the panel is operating under AC Mains failure and minimum battery voltage conditions (Refer to Table 10 & Table 11 for minimum panel output voltage).

## 3.4.5 Auxiliary Relay Outputs

**EN54-2 8.8**

**Fault Output:**

**Relay 1 is configured for failsafe operation as standard.**

- The ZX1E, ZX2E and ZX5E Fire Alarm Control Panels have two unsupervised, programmable relay outputs, with volt free (dry contact) changeover contacts.
- Each output is rated at 30V AC/DC, 1 Amp.
- Relay 1 is normally held in an energized state. It will de-energize under fault conditions.

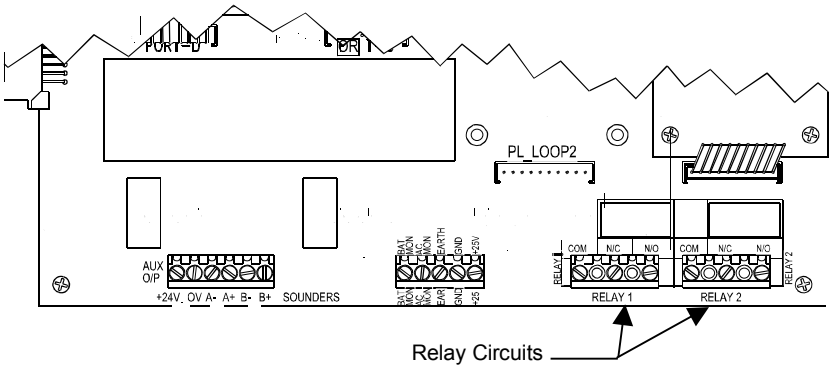



**Figure 16 – Relay Output Terminal Connection Points – ZX1E / ZX2E**

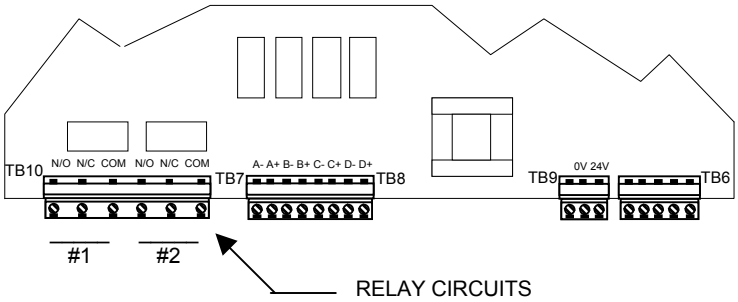



**Figure 17 – Relay Output Terminal Connection Points – ZX5E**

**Do not connect any wiring to the relay contacts that is not power limited.**

## 3.4.6 Auxiliary Supply Output

- The ZX1E, ZX2E and ZX5E Fire Alarm Control Panels have a power-limited, unsupervised auxiliary (AUX O/P) 24V-output supply rated at 340mA maximum.
- This supply can be used to power Remote Annunciator (Repeater) units and other peripheral loop units or other signalling loop units.

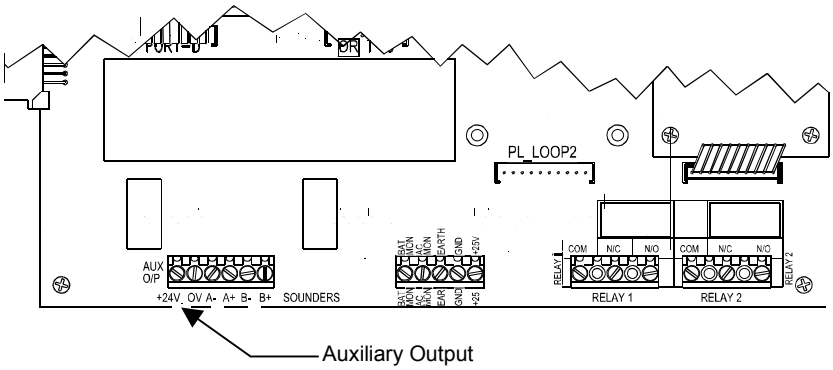



**Figure 18 – Auxiliary Output Connections – ZX1E / ZX2E**

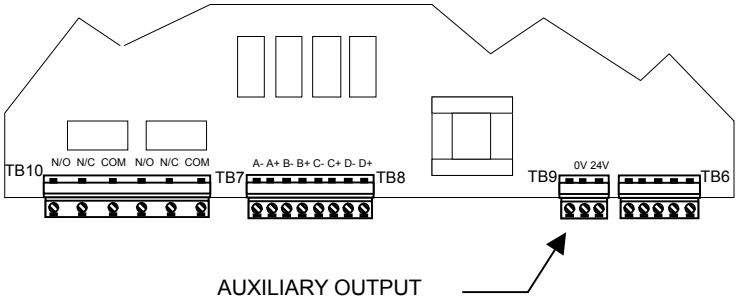



**Figure 19 – Auxiliary Output Connections – ZX5E**

**The total current loading of all detection loops, sounder circuits and auxiliary supply must not exceed the rated output capability of the panel – refer to specification tables.**

**For EMC Compliance, fit the supplied Ferrite Absorber (small) as shown in the diagram.**

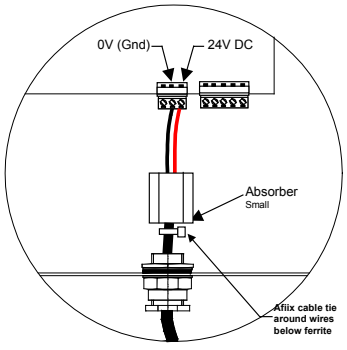
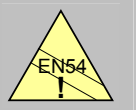



**Figure 20 – Auxiliary Output - Ferrite Absorber (Typical)**

## 3.4.7 Panel Networking / Graphics PC Interface



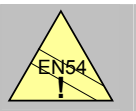

**EN54-2 12.5**

**Integrity of transmission paths:**

**The network does not provide the required transmission path integrity.**

- The Panel Network (Master to Slave panel) interface uses Port ‘C’ position on the base card.
- A Master Panel (ZX5E Only) can also be connected either to a Superior Master or to a Graphics PC using the Port ‘B’ position on the base card.
- The ZX1E cannot be installed in a network or to a Graphics PC.

### *3.4.7.1 Local Panel Network*



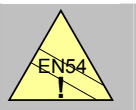

**EN54-2 12.5**

**Integrity of transmission paths:**

**The network does not provide the required transmission path integrity.**

- The ZX2E and ZX5E Fire Alarm Control Panels can be connected in a network of panels either with other ZX5E panels or with ZX2E panels.
- The panels can be connected in two types of configuration. These are, a Shared Zone Network in which panels share common zones and function as one system, a Report and Control Network in which individual panels or subsystems are networked for reporting and control purposes only.
- A panel network requires the installation of an Isolated RS485 Interface card in each panel, using Port ‘C’ interface position.
- For detailed information on networking and wiring installation for a panel network, refer to document P/N 996-075.

### *3.4.7.2 Master Panel to Superior Master Panel*



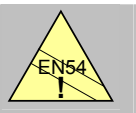

**EN54-2 12.5**

**Integrity of transmission paths:**

**The network does not provide the required transmission path integrity.**

- The network can be further extended, by connecting Network Master Panels to a Superior Master Panel (ZX5E Only).
- The network master panels are connected via an Isolated RS485 Interface Card in Port ‘B’ position to the Superior Master panel containing an Isolated RS485 Interface Card in Port ‘C’ position.
- For detailed information on networking and wiring installation for a panel network, refer to document P/N 996-075.

### *3.4.7.3 Panel to Graphics PC*



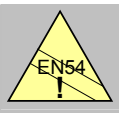

**EN54-2 12.5**

**Integrity of transmission paths:**

**The network does not provide the required transmission path integrity.**

- A Network Master panel or a Superior Master Panel may be connected to a Graphics PC for additional reporting and control purposes (ZX5E Only).
- The Graphics PC interface requires the installation of either an Isolated RS232 interface or an Isolated RS485 interface card using Port ‘B’ position.
- The ZX2E panel may be connected to a Graphics PC but may then not be connected in a network of panels.
- For detailed information on connecting and using a Graphics PC, refer to documents P/N 996-046 and 996-047.

### 3.4.8 Peripheral Loop




**EN54-2 12.5**

**Integrity of transmission paths:**

**The network does not provide the required transmission path integrity.**

- The ZX1E, ZX2E and ZX5E Fire Alarm Control Panels can be connected to a range of serial interface devices connected to the panel via the peripheral loop.
- The peripheral loop interface uses Port D position on the base card.
- A peripheral loop requires the installation of an Isolated RS485 Interface card in the panel.
- The RS485 peripheral communications link should be installed in a 'daisy chain' or 'loop' type wiring arrangement. For further details, refer to the Installation Guide supplied with the RS485 Interface Card.
- Each supervised peripheral device must be given an address. The address can be in the range 1 – 126. Refer to the Installation Guide for each peripheral type for details on the allowed address range.
- The maximum number of physical devices that can be connected to the peripheral loop is 31.

| Part Number | Device Description | | Supervised |
|---|---|---|---|
| 709-001 | ZXR5B | Active Remote Annunciator (Repeater) | YES |
| 709-101 | ZXR4B | Passive Remote Annunciator (Repeater) | NO |
| 795-015 | EXP-015 | 4-Way Sounder Module | YES |
| 795-065 | EXP-065 | 40-Way Remote Mimic (LED Driver) | YES |
| 795-015 | EXP-014 | 4-Way Relay Module | YES |
| 795-029 | EXP-029 | 8-Way Input Module | YES |

**Table 3 – List of Compatible Peripheral Devices**

## 3.4.9 RS485 Wiring Arrangements

**EN54-2 12.5**

**Integrity of transmission paths:**

**The network does not provide the required transmission path integrity.**

- The following diagrams show the wiring arrangements for 'daisy chain' and 'loop' installations of the panel network and peripheral data bus interfaces.
- Refer to Section 3.4.13 for a list of recommended cables.

### *3.4.9.1 Daisy Chain Style Installation*

- Form the peripheral or panel RS485 link by taking wires from the A and B terminals at one side of the interface board connector to the A and B terminals of the next device on the link.
- Continue wiring to all the units to be connected to the link – connecting A to A and B to B.
- Install EOL (150Ω, 0.5W minimum, P/N 170-073-151) resistors in the spare terminals in both the first and last units on the link.
- The maximum allowed length of the link is 1.2km (4000').

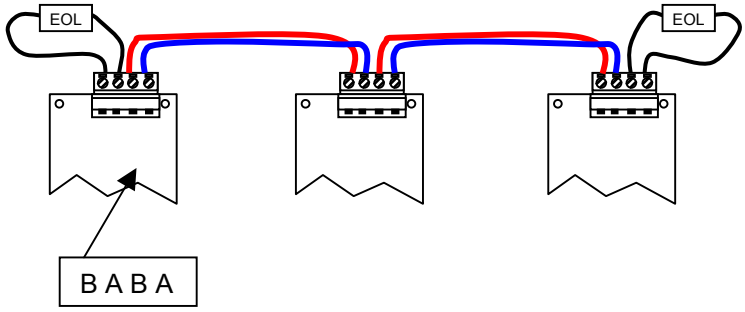



**Figure 21 – Typical RS485 – 'Daisy Chain' Wiring**

### *3.4.9.2 Loop Style Installation*

- Form the peripheral or panel RS485 link by taking wires from the A and B terminals at one side of the interface board connector to the A and B terminals of the next device on the link.
- Continue wiring to all the units to be connected to the link – connecting A to A and B to B.
- Install return wiring from the spare terminals on the last unit to the spare terminals on the first unit.
- The maximum allowed length of the complete loop is 1.2km (4000').

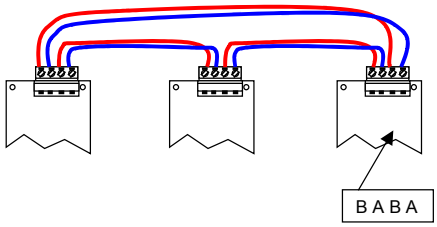



**Figure 22 – Typical RS485 – 'Loop' Wiring**

### *3.4.9.3 EMC Compliance*

**For EMC Compliance, fit the Ferrite Absorber supplied with the RS485 Interface board around the Peripheral (or Panel) Link cables.**

**The figure opposite shows the typical arrangement for a typical installation.**

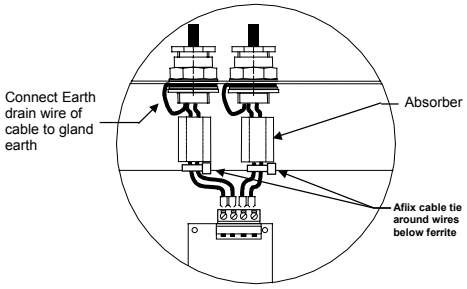



**Figure 23 – RS485 Loop – EMC Absorber Installation**

#### *3.4.9.4 Cable Screen – Earth Connections*

- During installation of a panel network the consequences of connecting remote grounds together must be considered.
- When wiring between RS485 cards and/or peripherals if a drain earth wire is available it **should not** be bonded to the chassis at both ends of the link.
- The drain earth wire should only be bonded to one of the panel chassis at the cable gland. The other end should not be bonded directly to the chassis but should be connected through a non-polarised 2.2uFcapacitor. This is shown opposite.

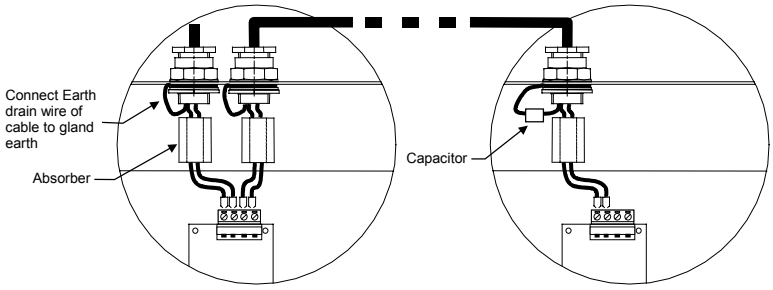


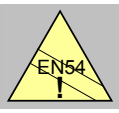

**Figure 24 – RS485 Screen – Earth Arrangement**

## 3.4.10 High Integrity Loop

- Hi485 Interface Modules can be used to create a 'High Integrity' RS485 Communications Loop for use on the Panel Network and Peripheral interface links.
- The 'High Integrity' Loop provides open and short circuit protection to ensure that information can still be passed around the loop if a single fault occurs. The loop can be extended to provide a communications network of up to 12km (39000') in distance.
- Refer to the Hi485 Installation Guide (996-065) for further information.

## 3.4.11 Group Disable Input

- The panel can be configured for an input device (loop call point / switch monitor or peripheral input) to act as a group-disable function. Refer to the commissioning manual for programming information.




**EN54-2**

**Group Disable**

- **The operation of a "Group Disable" input MUST be restricted to Level 2 access only. Install accordingly using a key switch to activate.**

## 3.4.12 Class Change Input

- A call point / switch monitor unit or peripheral input can be configured to activate as a class change input (refer to commissioning manual for programming information).

**EN54-2**

**Class Change Input**

- **The operation of a "Class Change" input MUST be restricted to Level 2 access only. Install accordingly using a key switch to activate or locate in a restricted area.**

## 3.4.13 Recommended Cables

**All cables connected to the ZX1E, ZX2E or ZX5E Fire Alarm Control Panels should be fire resistant cables. The drain earth wire, where available, should be connected to the earth tag on the cable entry gland and to a suitable earth point at the remote end of the cable.**

- Suitable cable types are listed below:
- Fire Rated Cables for Signalling Loops and Sounder Circuits
    1. AEI type Firetec Multicore Ref. F1C1 (1mm$^2$) to F1C2.5 (2.5mm$^2$) in 2 core.
    2. AEI type Firetec Armoured Ref. F2C1 (1.5mm$^2$) to F2C2.5 (2.5mm$^2$) in 2 core.
    3. AEI type Mineral Insulated Cable (all types up to 2.5mm$^2$).
    4. BICC types Mineral Insulated twin twisted conductor cables, Ref. CCM2T1RG and CCM2T1.5RG.
    5. BICC type Mineral Insulated Pyrotenax (all types up to 2.5mm$^2$)
    6. CALFLEX type Calflam CWZ 2 core type up to 2.5mm$^2$ maximum.
    7. PIRELLI type FP200 Gold 2 core type from 1mm$^2$ to 2.5mm$^2$
    8. FIRETUF (OHLS) FTZ up to 2.5mm$^2$. Manufactured by Draka
- Signal Cables for RS485 Communications Links (twisted pair)
    9. 12 AWG Signal 88202 Belden 9583 WPW999
    10. 14 AWG Signal 88402 Belden 9581 WPW995
    11. 16 AWG Signal 88602 Belden 9575 WPW991
    12. 18 AWG Signal 88802 Belden 9574 WPW975
    13. FIRETUF FDZ1000 by Draka 2 core.
    14. PIRELLI type FP200 Gold 2 core.

## 3.4.14 Base Card Power Supply Connections

- Panel upgrades and modifications may require the removal of the base card from the panel enclosure.
- The correct wire connections to on the base card are shown opposite. These are identical for the ZX1E, ZX2E and ZX5E panels.

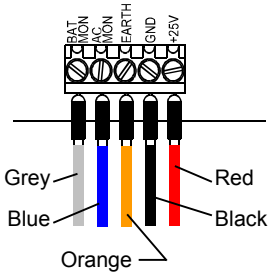



**Figure 25 – Base Card Power Connections**

## 3.4.15 Cable Routing

- Cables should be routed within the enclosure in accordance with the following diagram. Ensure that power-limited cables are routed separately from AC Mains and non power-limited cables.

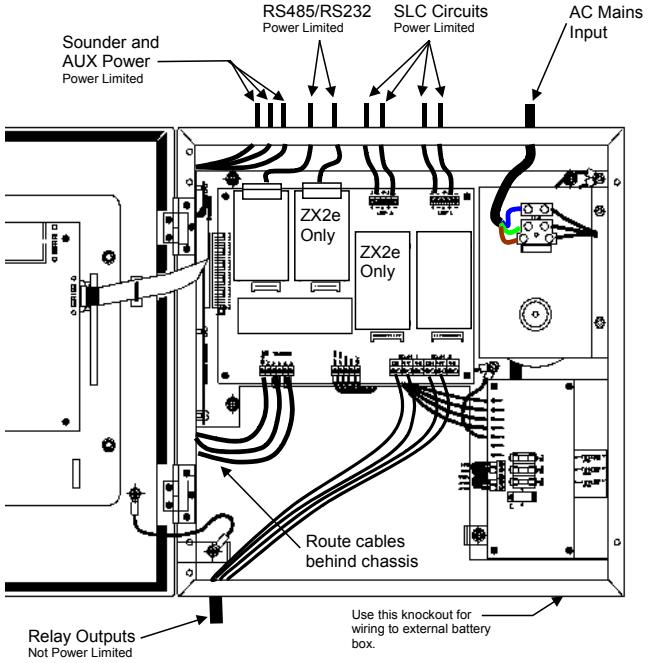



**Figure 26 – Recommended Cable Routing Arrangement – ZX1E / ZX2E**

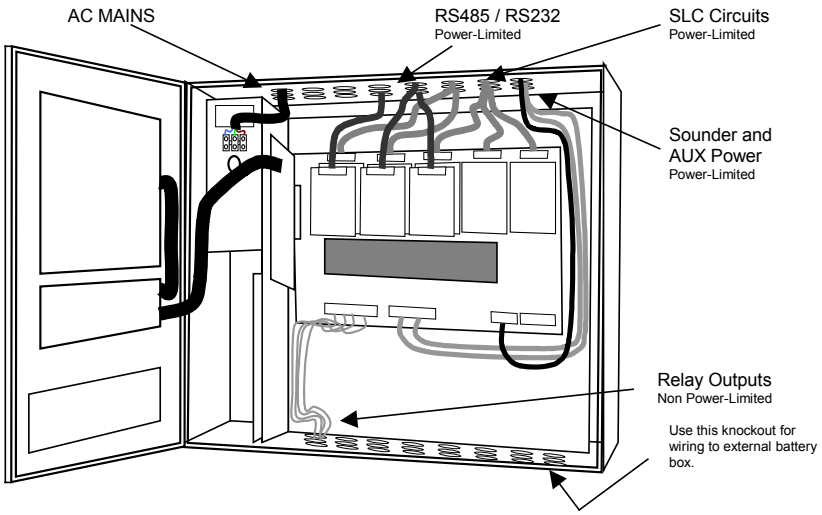



**Figure 27 – Recommended Cable Routing Arrangement – ZX5E**

## *3.5 Installing Additional Equipment*

### 3.5.1 General Introduction

**Always ensure that the mains and battery power supplies have been isolated before plugging or unplugging any of the internal circuit boards.**

**Follow the specific instructions supplied with each item of additional equipment.**

**At least one loop driver board MUST be installed for the unit to operate as a Fire Alarm Control Panel.**

- The following diagrams show the locations for installing additional equipment onto the base card.

#### *3.5.1.1 ZX1E Arrangement*

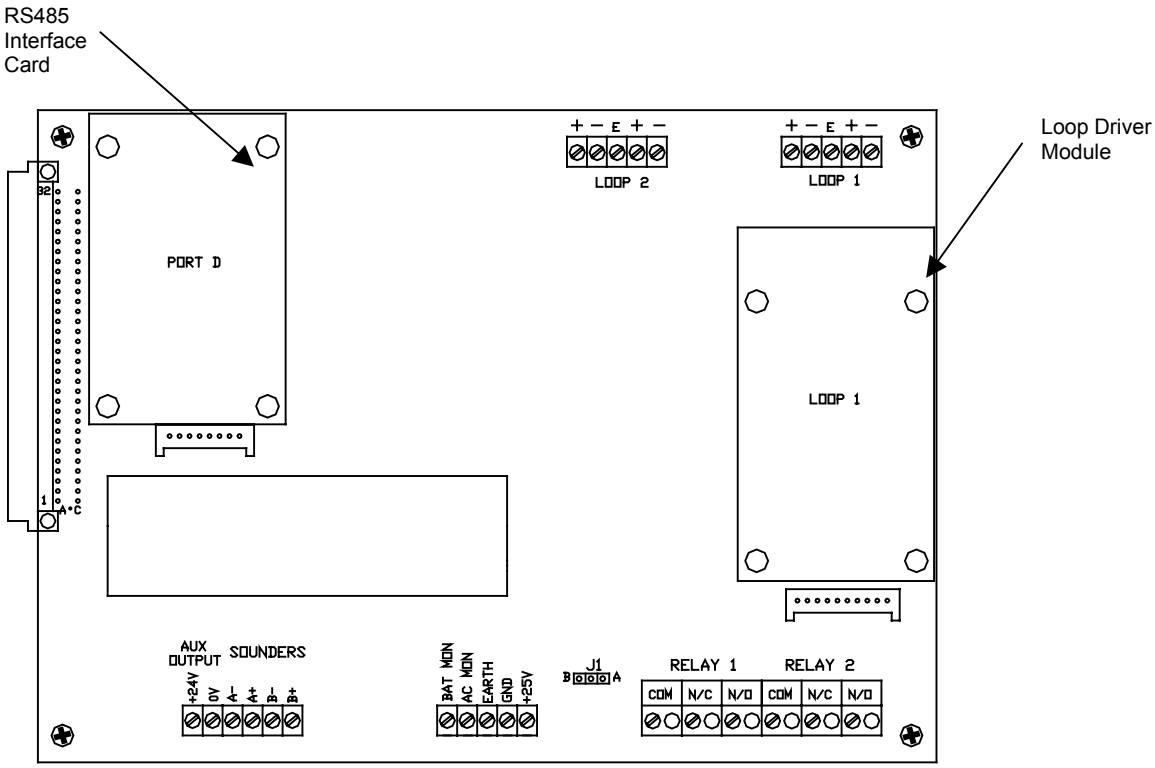



**Figure 28 – Positions for Additional Boards – ZX2E**

### *3.5.1.2 ZX2E Arrangement*

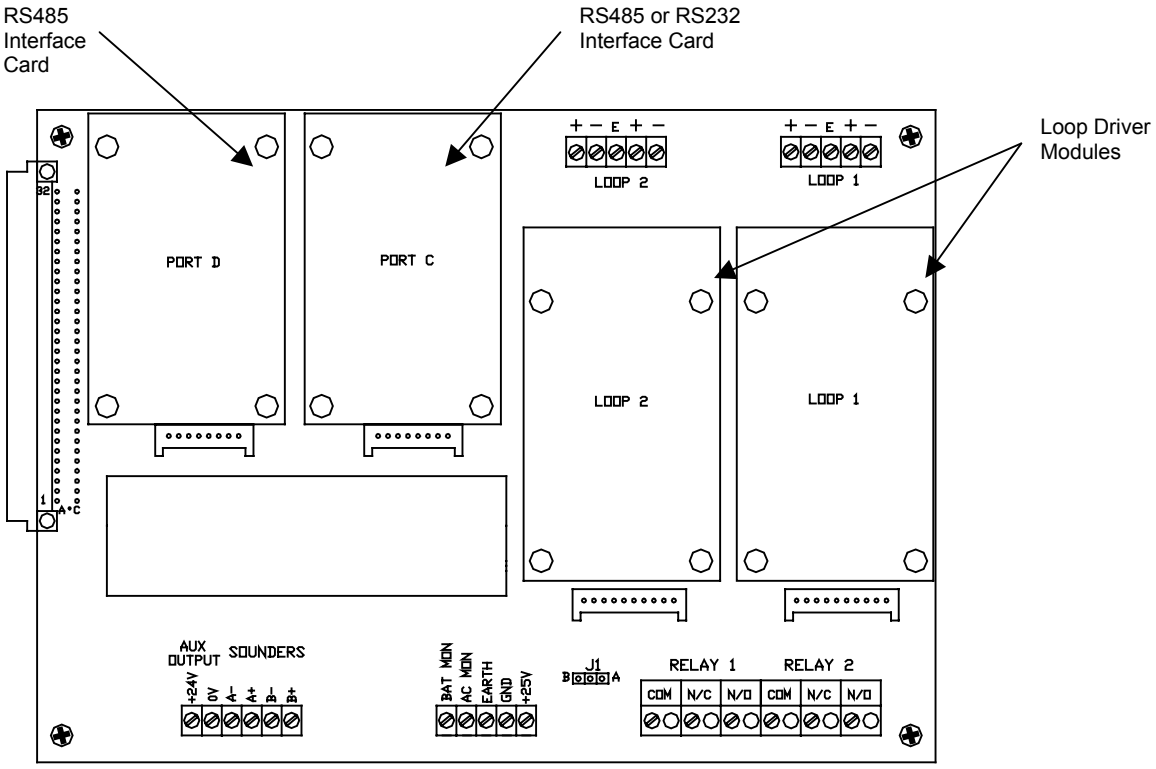



**Figure 29 – Positions for Additional Boards – ZX2E**

### *3.5.1.3 ZX5E Arrangement*

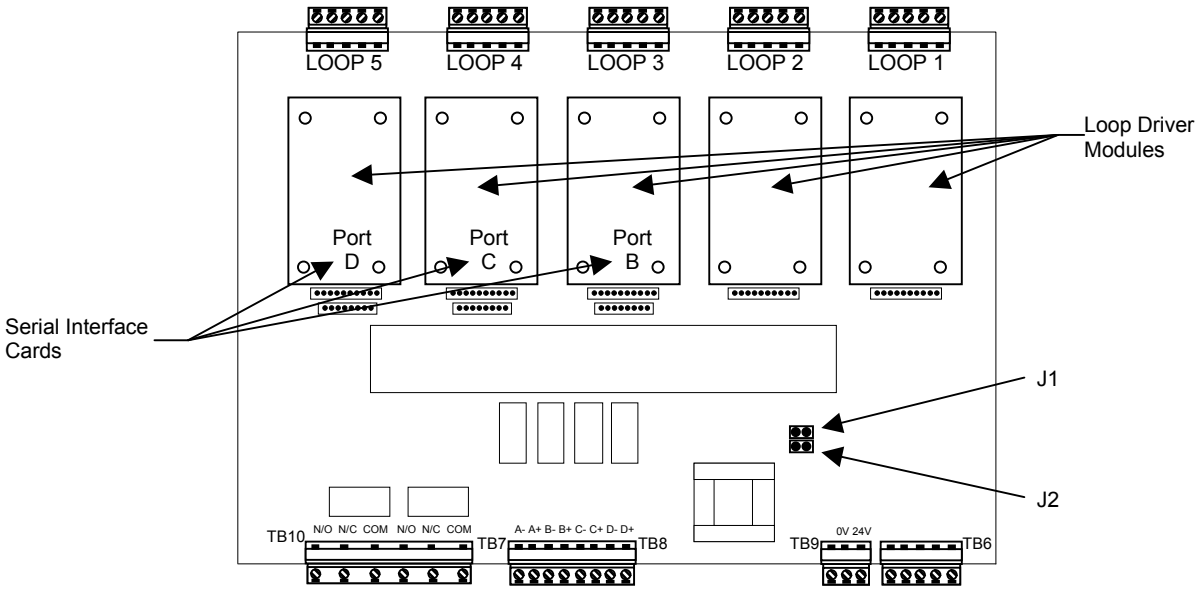



**Figure 30 – Positions for Additional Boards – ZX5E**

## 3.5.2 Loop Driver Cards

- Adding loop driver cards to the base unit expands the system. There are expansion slots for one loop driver card in ZX1E, up to two loop driver cards in ZX2E (designated Loop 1 and Loop 2) and up to five loop drivers in ZX5E (designated Loop 1 to Loop 5).
- Note that the first loop, designated 'loop 1' is situated at the top right hand side of the base card.
- Each card is secured with the four M3x6 screws supplied.

**Check that both the 10-way and 4-way connectors are correctly aligned and pushed fully home onto the pin headers.**

**When removing a loop driver, the latch on the 4-way header must be pushed away from the connector before attempting to pull the connector out.**

**The ZX2E and ZX5E Fire Alarm Control Panels only supports one manufacturer loop type at a time.**

**DO NOT install loop drivers of different types in the panel.**

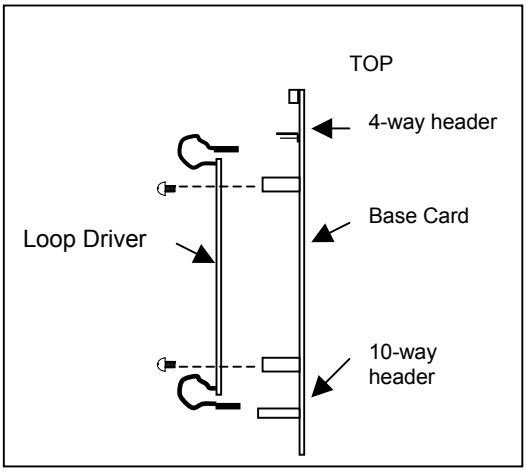



**Figure 31 – Mounting the Loop Driver**

### *3.5.2.1 Voltage Selection*

- The installation of each loop driver card requires the setting of a link or links to adjust the loop driver power supply for compliance with the different manufacturers' protocols.

#### 3.5.2.1.1 ZX1E / ZX2E Jumper Settings

- The loop voltage for each loop driver type is selected using the jumper link J1. The following table defines the position of J1 for each loop driver.

| Loop Driver | J1 Position |
|---|---|
| Morley-IAS | B |
| System Sensor | B |
| Apollo | A |
| Hochiki | A |
| Nittan | B |

**Table 4 – Jumper Setting for Loop Voltage**

**Ensure that the Jumper setting is in the correct position for the installed loop driver module before applying any power to the panel.**

#### 3.5.2.1.2 ZX5E Jumper Settings

- The loop voltage for each loop driver type is selected using the jumper links J1 and J2. The following table defines the position of J1 for each loop driver.

| Loop Driver | J1 Position | J2 Position |
|---|---|---|
| Morley-IAS | Open | Linked |
| System Sensor | Open | Linked |
| Apollo | Linked | Open |
| Hochiki | Linked | Open |
| Nittan | Open | Linked |

**Table 5 – Jumper Setting for Loop Voltage**

**Ensure that the Jumper setting is in the correct position for the installed loop driver module before applying any power to the panel.**

### 3.5.3 485 / 232 Interface Cards

**EN54-2 12.5**

**Integrity of transmission paths:**

**Use of these interface cards will not give the required transmission path integrity.**

- The system can be expanded to provide a data interface between the panel and control centres, peripheral devices, repeaters and annunciators and to network with other panels.
- The ZX1E base card is provided with one serial port (port D) to which an isolated RS485 serial interface card can be fitted.
- The ZX2E base card is provided with two serial ports (labelled C and D) to which isolated RS485 and RS232 serial interface cards can be fitted.
- The ZX5E base card is provided with three serial ports B, C and D (labelled PL2, PL3 and PL4) to which isolated RS485 and RS232 serial interface cards can be fitted.
- Port D supports up to 31 peripheral devices on an RS485 communications bus. These devices can be active ZXR5B or passive ZXR4B remote annunciators (repeaters), 4-way sounder modules, 4-way relay modules, 8-way input modules, 40-way Event Mimic (LED driver) modules and Hi485 modules.
- Port C supports a panel network connection using an RS485 communications bus or a panel to graphic PC data link using either an RS232 or an RS485 communications link.
- Port B (ZX5E Only) supports a network connection to a superior master panel using an RS485 communications bus or a panel to graphic PC data link using either an RS232 or an RS485 communications link.

### 3.5.3.1 *Mounting the card directly to the base card*

- Use either the four fixing screws (M3 x 6mm) or the four nylon spacers (M3 x 30mm), supplied with the module, to mount the card onto the nylon spacers on the base card.
- Plug the 8-way ribbon cable connector into the 8-way socket (S-PORT-D on ZX1E, S-PORT-C and S-PORT-D on ZX2E, PL2, PL3, PL4 on ZX5E) on the base card. Ensure the connector is fully inserted and that there is no misalignment.

**Ensure that the 8-way ribbon cable connector IS NOT inserted into the 10-way connector on the ZX5E base card.**

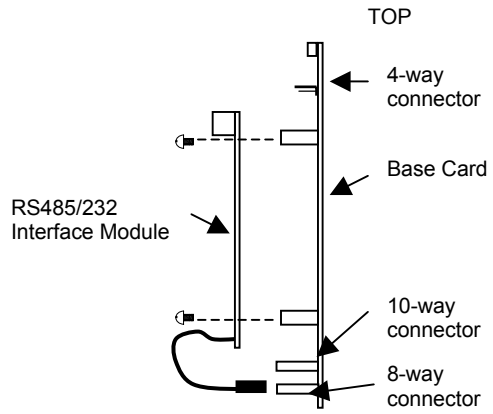



**Figure 32 – Mounting the RS485 / RS232 Module**

### 3.5.3.2 *Mounting the card above the Loop Driver Module*

- The three serial interfaces may require to be installed on top of the loop driver boards (loops 3 – 5) in the ZX5E panel.
- Use the four nylon spacers (M3 x 30mm), supplied with the RS485 module, to mount the loop driver card to the base card.
- Use the four fixing screws (M3 x 6mm), supplied with the module, to mount the RS485 card onto the nylon spacers on the loop driver card.
- Plug the 10-way and 4-way ribbon cable connectors of the loop driver card into the appropriate sockets on the base card.
- Plug the 8-way ribbon cable connector from the interface card into the 8-way socket (PL2, PL3, or PL4) on the base card. Ensure the connector is fully inserted and that there is no misalignment.

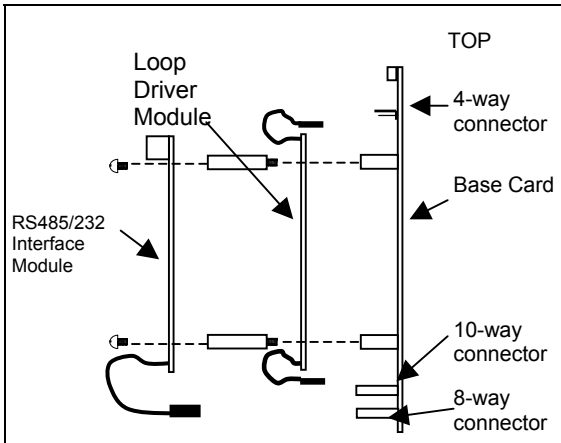
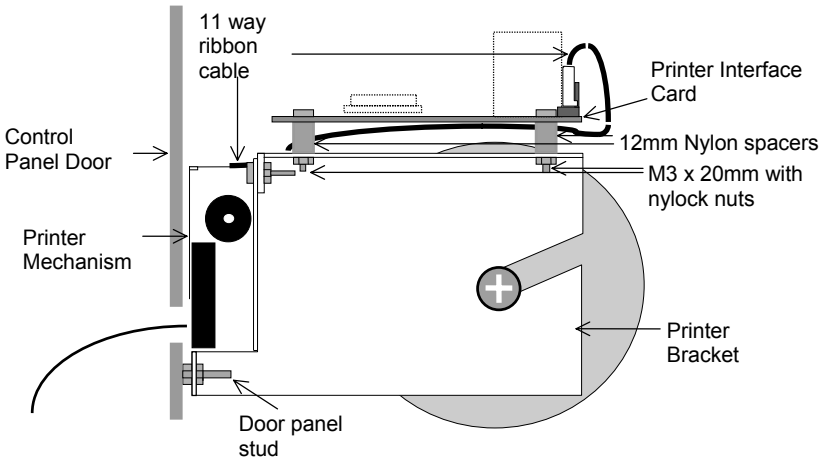



**Figure 33 – Mounting the RS485 / RS232 Module**

## 3.5.4 Printer Module (ZX5E Only)

- The printer module is mounted to the reverse of the front panel door on the printer mounting plate.
- Working from the rear of the panel mounting plate, carefully cut a slot in the front panel label using the slot in the metal plate as a guide. Remove any sharp edges around the periphery of the slot. Affix the self-adhesive tear-off guide, centrally over the slot, to the front of the panel.
- Screw down two of the supplied M3 nuts on to the metals studs on the printer mounting plate to act as spacers.




- Mount the printer assembly to the metal studs and secure in position with the remaining two M3 nuts, spring and plain washers. Ensure that the paper feeds through the slot.
- Connect the supplied 4-way ribbon cable between the printer driver board and the connector on the CPU Board. Fasten down the cable along the inner lid using tie-wraps and adhesive bases.
- Connect the transformer 8-volt secondary winding leads to the 2-way connector on the printer driver board. Fasten the leads to the chassis using cable ties and adhesive bases.
- After re-applying power, press the ‘FEED’ button on the printer assembly and ensure that the printer correctly feeds paper and the paper does not jam in the exit slot.

# 4 Standby Battery Calculations

| | | Quiescent Condition A | | Alarm Condition B | |
|---|---|---|---|---|---|
| Item | Qty | Each Unit | Total (A) (Units x Qty) | Each Unit | Total (A) (Units x Qty) |
| ZX2E Panel | 1 | 0.090 | 0.090 | 0.250 | 0.250 |
| RS485 Module (EXP-004) | | 0.059 | | 0.059 | |
| RS485 Module (EXP-004B) | | 0.025 | | 0.025 | |
| RS232 Module (EXP-005) | | 0.059 | | 0.059 | |
| Zone LED Expander (EXP-069-020 0r EXP-069-060) | | 0.014 | | 0.014 + 0.0005 per LED lit | |
| *Loop Driver Modules* | | | | | |
| System Sensor (EXP-068) | | 0.020 | | 0.020 | |
| Apollo (EXP-066) | | 0.040 | | 0.040 | |
| Hochiki (EXP-058-V5) | | 0.042 | | 0.042 | |
| Nittan (EXP-044) | | 0.030 | | 0.030 | |
| *Peripheral Units* | | *(Maximum 0.340 Amps total auxiliary 24V DC supply)* [4] | | *(Maximum 0.340 Amps total auxiliary 24V DC supply)* [4] | |
| ZXR5B (Active) | | 0.125[2] | | 0.150[3] | |
| ZXR4B (Passive) | | 0.125[2] | | 0.150[3] | |
| 4-Way Relay (EXP-014) | | 0.080[2] | | 0.160[3] | |
| 8-Way Input (EXP-029) | | 0.065[2] | | 0.065[2] | |
| 4-way sounder (EXP-015) | | 0.120[2] | | 0.220[3] | |
| 40-way Event / Mimic LED (EXP-065) | | 0.030[2] | | 0.280[3] | |
| Hi485 (EXP-038) or (EXP-038B) | | 0.125 / 0.040[2] | | 0.125 / 0.040[2] | |
| *Sensor Current* [1] | | | | | |
| | | | | | |
| Sounder A Load | | | | | |
| Sounder B Load | | | | | |

Other devices connected to the system but not listed above.

| | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | **Total A** | | **Total B** | |
| | | Standby Period | Total A x 24 = | Alarm Period | Total B x 0.5 = |
| | | **Total C** | | **Total D** | |
| | | **Battery Ah ( C + D ) x 1.2 =** | | | |

**Table 6 – Current Rating Chart – ZX1E / ZX2E**

1: Refer to Section –4.1 below.
2: Typical Quiescent currents quoted. Refer to data sheet for supply current range in all conditions.
3: Maximum Alarm Load quoted. Refer to data sheet for supply current range in all conditions.
4: Ensure total load of peripherals under all alarm and operating or fault conditions does not exceed maximum rating quoted.

| | | Quiescent Condition A | | Alarm Condition B | |
|---|---|---|---|---|---|
| Item | Qty | Each Unit | Total (A) (Units x Qty) | Each Unit | Total (A) (Units x Qty) |
| ZX5E Panel | 1 | 0.225 | 0.225 | 0.375 | 0.375 |
| RS485 Module (EXP-004) | | 0.059 | | 0.059 | |
| RS485 Module (EXP-004B) | | 0.025 | | 0.025 | |
| RS232 Module (EXP-005) | | 0.059 | | 0.059 | |
| Zone LED Expander (EXP-069-020 0r EXP-069-060) | | 0.014 | | 0.014 + 0.0005 per LED lit | |
| *Loop Driver Modules* | | | | | |
| System Sensor (EXP-068) | | 0.020 | | 0.020 | |
| Apollo (EXP-066) | | 0.040 | | 0.040 | |
| Hochiki (EXP-058-V5) | | 0.042 | | 0.042 | |
| Nittan (EXP-044) | | 0.030 | | 0.030 | |
| *Peripheral Units* | | *(Maximum 0.340 Amps total auxiliary 24V DC supply)* [4] | | *(Maximum 0.340 Amps total auxiliary 24V DC supply)* [4] | |
| ZXR5B (Active) | | 0.125[2] | | 0.150[3] | |
| ZXR4B (Passive) | | 0.125[2] | | 0.150[3] | |
| 4-Way Relay (EXP-014) | | 0.080[2] | | 0.160[3] | |
| 8-Way Input (EXP-029) | | 0.065[2] | | 0.065[2] | |
| 4-way sounder (EXP-015) | | 0.120[2] | | 0.220[3] | |
| 40-way Event / Mimic LED (EXP-065) | | 0.030[2] | | 0.280[3] | |
| Hi485 (EXP-038) or (EXP-038B) | | 0.125 / 0.040[2] | | 0.125 / 0.040[2] | |
| *Sensor Current* [1] | | | | | |
| | | | | | |
| Sounder A Load | | | | | |
| Sounder B Load | | | | | |
| Sounder C Load | | | | | |
| Sounder D Load | | | | | |

Other devices connected to the system but not listed above.

| | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | **Total A** | | **Total B** | |
| | | Standby Period | Total A x 24 = | Alarm Period | Total B x 0.5 = |
| | | **Total C** | | **Total D** | |
| | | **Battery Ah ( C + D ) x 1.2 =** | | | |

**Table 7 – Current Rating Chart - ZX5E**

1: Refer to Section –4.1 below.
2: Typical Quiescent currents quoted. Refer to data sheet for supply current range in all conditions.
3: Maximum Alarm Load quoted. Refer to data sheet for supply current range in all conditions.
4: Ensure total load of peripherals under all alarm and operating or fault conditions does not exceed maximum rating quoted.

- The ZX5E Fire Alarm Control Panel supervises and charges the two 12-volt batteries that make up the standby power source. Batteries are available commercially and should be of the sealed lead acid type. Suggested suppliers for the Batteries are Yuasa and Powersonic.
- Use the current rating chart, along with the following formulae, to determine the size of the batteries to satisfy the specific installation conditions.
- Batteries with capacity greater than 24Ah should be installed in a separate enclosure that is suitable for Fire Protection Use such as Battery Box – 797-025-001, with wiring connected to the panel through conduit.

## *4.1 Sensor Current Calculations*

### 4.1.1 Quiescent Load

- Refer to the manufacturers' published data sheets for the supply current required by each sensor type in normal mode. Take into account the figures quoted for whether the detector LED flashes when the signalling device is addressed – refer to the Commissioning manual for details of the Setup parameter to turn this blinking on / off.
- Calculate the total current required by the sensors connected to all signalling loops. This should be based on the quantity of each device installed and the supply current required for the device.

### 4.1.2 Alarm Load

- Refer to the manufacturers' published data sheets for the supply current required by each sensor type.
- Calculate the total current required by the sensors connected to all signalling loops. This should be based on the quantity of each device installed and the supply current required for the device as above.
- When a fire alarm condition is registered, the panel will turn on the sensor LED indicators for the first four sensors that register an alarm. Refer to the manufacturers' data sheet for the current supply required for these LED indicators.
- Calculate the total current required by any loop driven sounders or output modules active in alarm conditions. NOTE: The LED of all activated System Sensor output modules will be turned ON.

### 4.1.3 Adjustment Factors

- The figures calculated for sensor current, above, should be multiplied by the following adjustment factors before being used in the Current Rating Chart.
    1. For Apollo and Hochiki devices: multiply by 1.5
    2. For System Sensor and Nittan devices: multiply by 1.25

## *4.2 Local Systems Ampere Hour Calculation*

- Use the following formula to calculate the size of batteries required for the installation.
- These installations require a standby period of 24 hours plus thirty minutes of alarm operation at the end of the standby period.

C = Total A * 24 hours
D = Total B * 0.5 hours

**Battery Ah = 1.2 * (C + D)**

# 5 Maintenance

## *5.1 Maintenance Schedule*

- The following Maintenance routine as recommended in EN54-14 should be adopted.

### 5.1.1 Daily Attention

- The user should check the following:
    1. The panel should indicate normal operation & if not the fault should be recorded in a logbook & reported to the servicing organization.
    2. Any faults previously reported have received attention.

### 5.1.2 Monthly Attention

- The user should check the following:
    1. Any stand-by generators should be started and fuel levels checked.
    2. At least one call point or detector (from different zones each month) should be operated to test the fire panel and any connected alarm/ warning devices.
    3. Where permissible, any link to the fire brigade or remote manned centre should be operated.
- Any faults should be recorded in the log book & corrective action taken as soon as possible.

### 5.1.3 Quarterly Attention

- The service organization should arrange to test the following:
    1. Check entries in the logbook & inspect the panel's log, taking appropriate remedial action where necessary.
    2. Examine all battery connections.
    3. Check the alarm, fault and ancillary functions of the control and indicating equipment.
    4. Visually inspect the control and indicating equipment for any moisture ingress or other deterioration.
    5. Enquire if any structural alterations have been made which could affect the operation of call points, detectors or sounders, if so carry out a visual inspection.
- Any defects should be recorded in the logbook and corrective action taken as soon as possible.

### 5.1.4 Yearly Attention

- The service organization should arrange to test the following:
    1. Carry out the test & inspection routines recommended daily, monthly & quarterly.
    2. "Walk Test" the system and check that each detector operates in accordance with the manufacturers recommendations.
    3. Visually inspect all cable fittings and ensure equipment is secure, undamaged and adequately protected.
    4. Examine and test all batteries NB: Note the expected operating life shown in section E.
- Any defects should be recorded in the logbook and corrective action taken as soon as possible.

## *5.2 Replacement of Components*

- All components used in the control panel have been chosen for high reliability and long life. The manufacturers' data on the following items indicates that they may have a life expectancy of less than 15 years and so may need to be replaced in the future.

### 5.2.1 Lithium Standby battery

**CAUTION: A Lithium Battery is used for Data Retention.**

**Replace only with the same or equivalent type. Contact the Service Organisation for Replacement CPU Card.**

| | | |
|---|---|---|
| Manufactures expected life | - | In excess of 10 Years |
| Recommended replacement | - | 10 years for panels in continuous service. 4 years for CPU cards held as spares and not powered up. |

### 5.2.2 Liquid Crystal Alphanumeric Display

| | | |
|---|---|---|
| Manufactures expected life | - | In excess of 10 Years. |
| Recommended replacement | - | When the display becomes difficult to read. |

- The LED backlit liquid crystal display gives a life that is significantly better than most other display technologies. The contrast of the LCD will gradually deteriorate as this part ages. This item can therefore be changed when normal contrast starts to fade.

### 5.2.3 Standby Batteries

| | | | | |
|---|---|---|---|---|
| Manufacturers expected life | - | 3-5 years at an ambient temperature of 20 Celsius, NB life decreases approximately 50% for every 10° Celsius increase in temperature. | | |
| Recommended service | - | Contact Battery manufacturer / supplier | | |
| Recommended Suppliers | - | Yuasa | | |
| Types | - | 7AH | Model#: | NP7-12 |
| | - | 12AH | Model#: | NP12-12 |
| | - | 17AH | Model#: | NP18-12 |
| | - | 24AH | Model#: | NP24-12B |

**Before installation.**

**New Batteries require 'top charging' prior to being put into service.**

**Yuasa recommend top charging at 28.8V DC for 15 – 20 hours for batteries up to 6 months old from data of manufacture.**

**It is normal for lead-acid type batteries to discharge hydrogen whilst being charged. The panel is adequately ventilated to dissipate this hydrogen.**

**DO NOT seal the panel enclosure or mount the panel in a sealed enclosure or cavity.**

**Dispose of batteries in a responsible manner and in accordance with any local regulations.**

# 6 Specifications

## *6.1 Functional Specifications*

| Specification Item | Values |
|---|---|
| Enclosure | 400mm wide, 400mm high, 135 mm deep<br>Sealed to IP30. |
| Weight | 10 kg without batteries.<br>18.5 kg with 12AHr batteries fitted. |
| Operating Temperature | 0°C to +40°C |
| Relative Humidity | 85% (non-condensing) |
| Knockouts (20mm) | 14 (Top), 2 (Bottom) |
| Sounder (NAC) Output | 2 programmable outputs.<br>Open and short circuit monitored.<br>6K8, EOL resistors (P/N 170-073-682).<br>1A maximum output current.<br>Minimum switched current – 1mA |
| Auxiliary Relay | 2 programmable volt-free, changeover outputs.<br>Contacts rated at 24V AC/DC, 1 Ampere, 0.6PF maximum.<br>Minimum switched load – 1mA @ 5V |
| Sensor Circuit | ZX1E – 1 plug-in loop driver module per panel.<br>ZX2E – 1 to 2 plug-in loop driver modules per panel.<br>Supports Analogue Addressable devices over a 2 wire combined power and digital data transmission loop.<br>Loop Output Voltage and Signalling depends on the loop driver installed – refer to documentation supplied with the loop driver.<br>Maximum Loop Loading is 0.5A for all loops. |
| Monitoring zones | Up to 20 zones with individual LED indicators.<br>Maximum 120 zones – up to 100 software zones (no LED indicators). |

**Table 8 – ZX1E / ZX2E Functional Specifications**

| Specification Item | Values |
|---|---|
| Enclosure | 500mm wide, 500mm high, 180 mm deep.<br>Sealed to IP30 |
| Weight | 19 kg without batteries<br>38.2 kg with 25AHr batteries fitted |
| Operating Temperature | 0°C to +40°C |
| Relative Humidity | 85% (non-condensing) |
| Knockouts (20mm) | 24 (Top), 24 (Bottom) |
| Sounder Output | 4 programmable outputs<br>Open and short circuit monitored.<br>6K8, EOL resistors (P/N 170-073-682).<br>1A maximum output current.<br>Minimum switched current – 1mA |
| Auxilliary Relay | 2 programmable volt free changeover outputs<br>Contacts rated at 30V AC/DC, 1 Ampere maximum<br>Minimum switched load – 1mA @ 5V |
| Sensor Circuit | 1 to 5 plug-in loop driver modules per panel<br>Supports Analogue Addressable devices over a 2 wire combined power and digital data transmission loop.<br>Loop Output Voltage and Signalling depends on the loop driver installed – refer to documentation supplied with the loop driver.<br>Maximum Loop Loading is 1.25A for all loops. |
| Monitoring zones | Up to 20 zones with individual LED indicators, expandable to 40 / 80 zones with optional LED indicator boards.<br>Maximum 120 zones – up to 40 software zones (no LED indicators). |

**Table 9 – ZX5E Functional Specifications**

## *6.2 Power Supply and Charger*

| Specification Item | Values |
|---|---|
| Operating Voltage | 230V 50Hz AC<br>(or 120V 60Hz AC[1]) |
| Voltage tolerance | + 10% - 15% |
| Incoming mains fuse | F1 2A 20mm HRC anti-surge fuse in AC Mains TB |
| Power supply card input | 24V & 7V AC from integral mains transformer |
| Power supply card fuses | FS1 3.15A 20 mm HRC anti-surge<br>FS2 1.6A 20 mm HRC anti-surge<br>FS3 5A 20 mm HRC anti-surge |
| Max. Power supply output<br>(short term 10 min. rating) | 2.7 Amps total maximum, comprising<br>0.7A temperature compensated lead acid battery charger<br>2A external load including the control panels quiescent current (i.e. sounder current + aux. supply current + loop current) |
| Continuous Power supply Output Rating | 2.5 Amps total, comprising<br>0.7A battery charging<br>0.5A Internal circuit boards (2x485 cards + 2x loop driver cards)<br>1.3A external load[2] |
| D. C. Output Voltage | 26.5V Maximum & 19.5V Minimum[3] |
| Max. Ripple Voltage | 1.7V peak-peak @ Maximum Output loading |
| Battery Charger Output | 27.4 V nom at 20°C (temperature compensated) |
| Quiescent current | 90mA. + Loop driver / option card current + external circuits |
| Alarm current | 250mA. + Loop driver / option card current + external circuits |
| Standby Batteries[4] | 24V sealed lead acid<br>Minimum Capacity - 6 Ah (Internally Fitted)<br>Maximum Capacity - 12 Ah (Internally Fitted)<br>Maximum Capacity - 17 Ah (Externally Fitted) |

**Table 10 – ZX1E / ZX2E Power Supply and Charger Specifications**

[1] With appropriate transformer fitted.
[2] If loop sounders are used, the maximum output from the two loop driver cards will be 400mA maximum. This will have to be deducted from the 1.3A external load.
[3] At V battery = 21V and mains supply disconnected.
[4] Refer to Section 5.2.3 for a list of recommended batteries and suppliers.

| Specification Item | Values |
|---|---|
| Operating Voltage | 230V 50Hz AC<br>(or 120V 60Hz AC[1]) |
| Voltage tolerance | + 10% - 15% |
| Incoming mains fuse | FS1 3.15A 20mm HRC anti-surge fuse - Chassis mounted |
| Power supply card input | 24V AC from integral mains transformer |
| Power supply card fuses | F1 5A 20mm HRC anti-surge fuse<br>F2 5A 20 mm HRC anti-surge |
| Max. Power supply output<br>(Short term 10 min. rating) | 3.75 Amps total maximum, comprising<br>1.00 Amps temperature compensated lead acid battery charger<br>0.75 Amps internal circuitry<br>2.00 A external load including the control panels quiescent current (i.e. sounder current + aux. supply current + loop current) |
| Continuous Power supply Output Rating | 3.25 Amps total, comprising<br>1.00 Amps battery charging<br>0.75 Amps Internal circuit<br>1.50 Amps external load[2] |
| D. C. Output Voltage | 25.5V Max & 20V Min[3] |
| Maximum Ripple Voltage | 1.9V peak-peak. |
| Battery Charger Output | 27.4 V nom at 20°C (temperature compensated) |
| Quiescent current | 225mA + loop driver / option card current + external circuits |
| Alarm current | 375mA + loop driver / option card current + external circuits |
| Standby Batteries[4] | 24V sealed lead acid<br>Maximum Capacity - 25 Ah<br>Minimum Capacity - 12 Ah |
| Printer Supply | 8V AC from integral mains transformer for optional panel mounted printer |

**Table 11 – ZX5E Power Supply and Charger Specifications**

[1] With appropriate transformer fitted.
[2] If loop sounders are used, the maximum output from the five loop driver cards will be 1000mA maximum. This will have to be deducted from the 1.5A external load.
[3] Output = Battery voltage – 1.0 volts under AC Mains power failure conditions.
[4] Refer to Section 5.2.3 for a list of recommended batteries and suppliers.

# NOTES

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